

Cooperative Institute for Climate and Satellites (CICS)

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CICS-NC

NC State University

Overview

- What is a NOAA Cooperative institute (CI)?
- Where are the current CIs located?
- How are CIs formed?
- How are CIs structured and funded?
- What is CICS?
- CICS-MD
- CICS-NC
- UNC System relationships
- Where is NOAA going with climate?
 - What role might CICS play?

NOAA Cooperative Institutes

NOAA Cooperative Institutes are academic and non-profit research institutions that demonstrate the highest level of performance and conduct research that supports NOAA's Mission Goals and Strategic Plan.

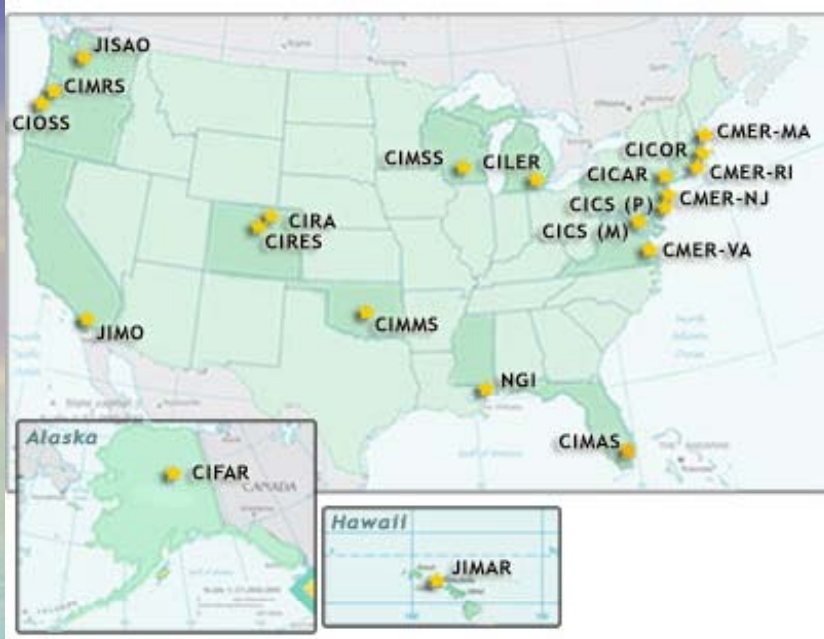
Because many Cooperative Institutes are collocated with NOAA research laboratories, there is a strong, long-term collaboration between scientists in the laboratories and in the university.

Cooperative Institutes not collocated with a NOAA laboratory often serve diverse research communities and research programs throughout NOAA. Cooperative Institutes serve an additional important function: they help educate and train the next generation of NOAA's and the nation's scientific workforce.

Many of the cooperative agreements between NOAA and our academic partners provide for formal NOAA sponsorship of students through fellowships.

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<http://www.nrc.noaa.gov/ci/>



NOAA Cooperative Institutes (CIs)

Currently NOAA supports 21* Cooperative Institutes in 17 states whose research portfolios range from satellite climatology and fisheries biology to atmospheric chemistry and coastal ecology.

Cooperative Institutes are assigned to a NOAA Line Office, whose responsibility includes the oversight of the initial competition process, performance, funding throughout the award period, and managing the renewal and termination process, if necessary.

Cooperative Institutes are located at parent institutions whose geographic expanse extends from Hawaii to Massachusetts and -- from Alaska to Florida.

<http://www.nrc.noaa.gov/ci/locations/index.html> *More now!

How are CIs formed?

NOAA establishes a Cooperative Institute when it determines that it will be beneficial to sponsor a long-term (5-10 years) collaborative partnership with one or more outstanding non-federal, non-profit research institutions.

For NOAA, the purpose of this partnership is to promote research, education, training, and outreach aligned with NOAA's mission, to obtain research capabilities that do not exist internally, and/or to expand research capacity in NOAA-related sciences. New Cooperative Institutes may be proposed by one or more Line Offices, Goal Teams, and/or the NOAA Research Council according to the procedures for establishing Cooperative Institutes described in the Cooperative Institute Handbook.

Only the Under Secretary of Commerce for Oceans and Atmosphere (the Under Secretary) can approve the establishment of a new Cooperative Institute.

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How are CIs structured & funded?

Activities at Cooperative Institutes are usually organized into three tasks:

- **Task I - Task I activities are related to the management of the Cooperative Institute, as well as general education and outreach activities. This task can also include support of postdoctoral and visiting scientists conducting research that is approved by the Cooperative Institute Director in consultation with NOAA, and is relevant to NOAA's mission goals.**
- **Task II - Task II research activities usually involve on-going direct collaboration with NOAA scientists. This collaboration typically is fostered by the collocation of federal and Cooperative Institute employees.**
- **Task III - Task III research activities require minimal collaboration with NOAA scientists and may include research funded by other NOAA competitive grant programs.**

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NESDIS Cooperative Institutes



Most of NOAA Cooperative Institutes are managed by OAR and NESDIS. The NESDIS CIs (above) are focused on aspects of research related to satellite and instrument development, implementation and operation, and, now, climate data and information-related research.

Three of the NESDIS CIs are collocated with Branches of the Cooperative Research Programs Division of STAR. This association enhances the research capabilities of STAR and facilitates strong collaboration between academic and NOAA scientists.

http://www.star.nesdis.noaa.gov/star/CoRP_index.php

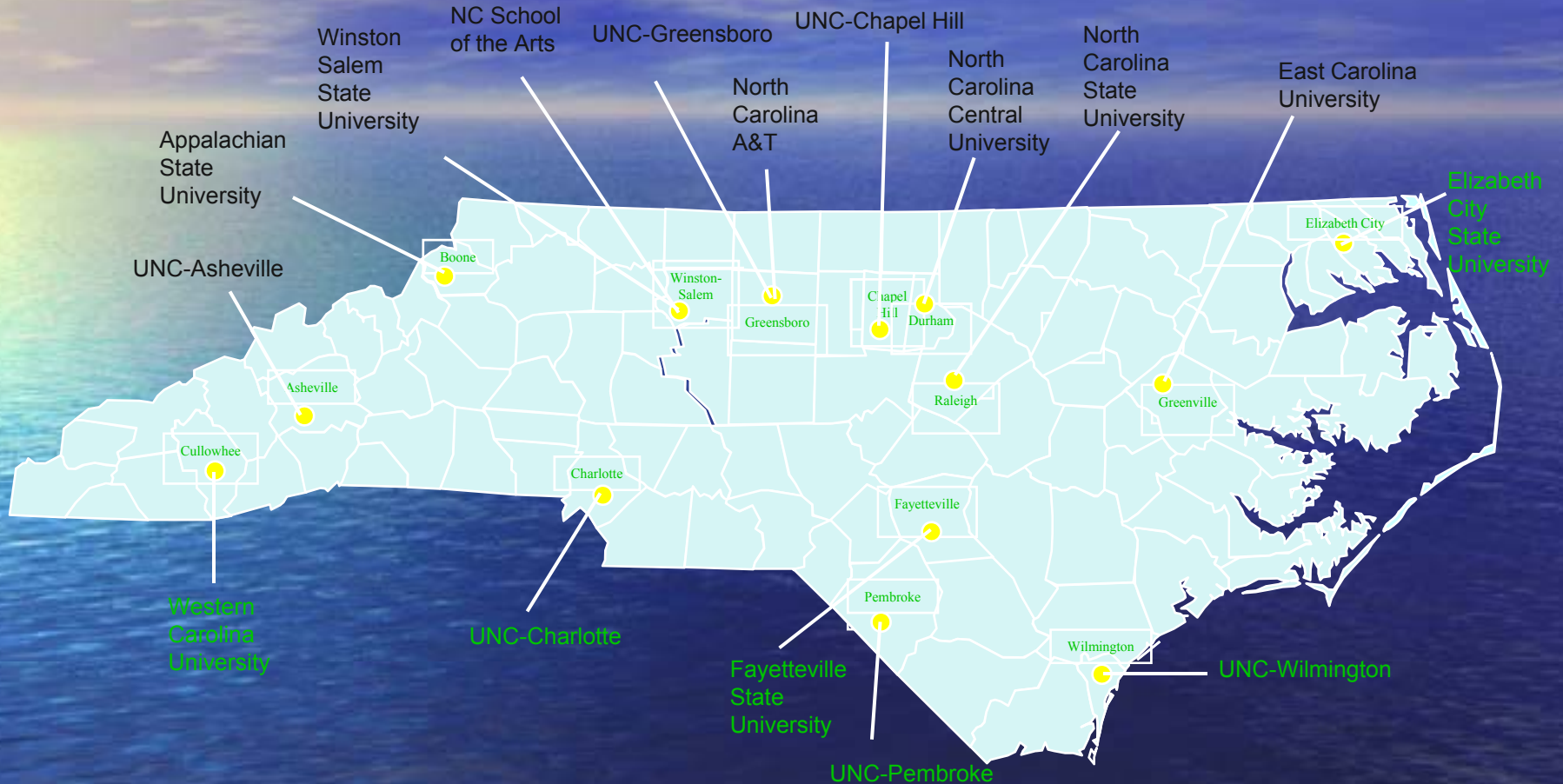
What is CICS?

- *CICS* is the *Cooperative Institute for Climate and Satellites*
- One of the newer NOAA CIs
- Has a very long heritage from CICS at Maryland
- Two main centers: CICS-MD and CICS-NC
- With partners from many other academic, non-profit, and private institutions, including
 - JGCRI, Princeton, UCI, Howard, Columbia/IRI and CUNY
 - OSU, Miami, Duke, UNC Chapel Hill, CSU and RSS
 - Climate Central, NC Arboretum, CECI, RENCi and ORNL
- Provides foci for collaborative research and associated activities in support of NOAA mission goals related to meteorological satellite and climate data and information research and development. The broad CICS consortium constitutes a first step toward the implementation of the infrastructure required to support a National Climate Service

National Partners



UNC Partnerships



CICS Scientific Vision

- Centers on observation from Earth-orbiting satellites and prediction using realistic mathematical models of the present and future behavior of the Earth System
- Observations include the development of new ways to use existing observations, the invention of new methods of observation, and the creation and application of ways to synthesize observations from many sources into a complete and coherent depiction of the full system
- Prediction requires the development and application of coupled models of the complete climate system, including atmosphere, oceans, land surface, cryosphere and ecosystems
- Underpinning all of these activities is the fundamental goal of enhancing our collective interdisciplinary understanding of the state and evolution of the full Earth System. This vision is central to NOAA's Goals, and CICS scientists work on projects that advance key NOAA objectives

CICS Research Themes

- Climate and Satellite Research and Applications
- Climate and Satellite Observations and Monitoring
- Climate Research and Modeling

CICS Management

- Phil Arkin serves as Director of the overall CI as a whole as well as CICS-MD
- Otis Brown is Director of CICS-NC
- Executive Board with 3 senior leaders each from UMCP, NCSU and NOAA advises the Directors
- Scientific management TBD – various methods being discussed

CICS-MD

- Focus on the collaborative research into satellite observations and Earth System modeling conducted by the Center for Satellite Applications and Research of NOAA/NESDIS and the National Centers for Environmental Prediction of NOAA/NWS
- Located at UMCP: ESSIC with AOSC, GEOL, GEOG
- CICS-MD support in this first year was about \$5M
- Personnel:
 - 20 scientists
 - 15 UMCP faculty
 - 5 NOAA Satellite Climate Studies Branch staff
 - 5-10 students

CICS-NC

- Focus primarily on the collaborative research into the use of satellite observations in climate research and applications that will be led by the National Climatic Data Center of NOAA/NESDIS
- CICS-NC is an inter-institutional research institute of the University of North Carolina university system (in process!)
- Hosted by NCSU and located at NCDC with strong partnerships in the Asheville region and across the state
- CICS-NC support in this first year was ~\$1.25M, with a substantial upward ramp expected in the next couple of years
- NOAA's estimate for the size of CICS-NC was about 20 scientists

CICS Rationale

The importance of the Earth's climate, its variability and change, is well-recognized by both the private and public sectors of American society. The scientific community has repeatedly stated that our collective ability to anticipate and plan for future climates will depend significantly on recorded, preserved, and available observations that capture well the dynamics of climate. A focal element of the scientific community has been to assure the existence, climate-quality, and availability of Climate Data Records (CDRs) and Climate Information Records (CIRs). These records are primarily, but not exclusively, derived from satellite data.

...Berrien Moore

...this defines CICS-NC's principal role

CICS Activities in Oceans and Climate

- CICS from its initial formation has been the NESDIS link to climate-focused satellite-oriented research
- CIOSS is the NESDIS CI focused on oceans, but given the oceans' role in climate CICS has an obvious strong connection – Oregon State University (CIOSS host) is a member of the CICS Consortium
- CICS connection with NCDC will emphasize the role of observations of all kinds, particularly those from satellites, to address NOAA's climate mission
- Practically: CICS provides a useful mechanism for collaborative science, student and post-doc support, and multi-institutional projects

CICS Activities in the Carolinas

- All UNC system institutions are CICS-NC partners
- Once the inter-institutional center, the “North Carolina Institute for Climate Studies (NCICS)” is approved, there will be a facile way for any and all campuses to work with CICS-NC and its federal partners
- CICS is concerned with assessment, impacts, mitigation, adaptation and resilience of climate impacts
- CICS focus in the Carolinas is an aspect of regional assessment, as well as climate science, workforce building, education and stakeholder involvement
- Impacts include the longer term changes of precipitation, sea level, severe weather frequency, ecosystem health, etc. and their impacts on the well being of Carolinians

NOAA commits to providing critical assets in science and service to a Federal partnership



Information Delivery and Decision Support

NOAA uses its national and regional infrastructure to deliver climate services today

Assessments of Climate Change and Impacts

NOAA is a leader in national and regional climate impact assessments

Over 70% of Federal IPCC AR4 WG1 authors were from NOAA

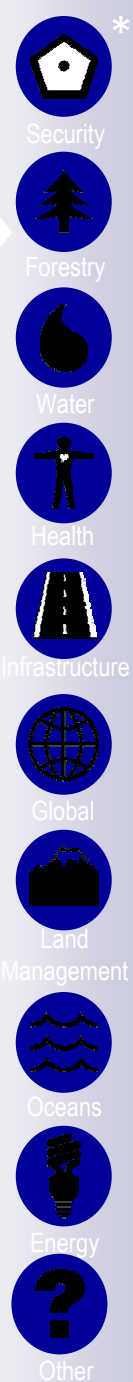
Climate Change Research and Modeling

International award winning models of the global climate

Climate Observations and Monitoring

NOAA operates over 90 observation and monitoring systems

NOAA is mandated to monitor and provide access to climate data and information



Near-Term Enhancements

- Observations
 - Satellites
 - Solar irradiance, earth radiation budget, ozone profiling on NPOESS
 - Climate Reference Network
 - Add 29 stations in Alaska
- Climate Change Modeling
 - Reduce uncertainties in decadal variability, abrupt change, and Arctic processes
- High Performance Computing for Climate Modeling
 - New Installations at Oak Ridge and Fairmont, West Virginia under construction with a goal of pflop capacity

Near-Term Enhancements

- Black Carbon
 - Instrument development to measure aerosol concentrations, optical and chemical properties
 - Measure abundances, properties and effects
 - Quantify emissions from sources
- Ocean Acidification
 - Monitor OA at 20 deep ocean and coastal moorings
 - Develop protocols for OA lab experiments on effects on marine organisms
 - Establish OA Program Office

Near-Term Enhancements

- Regional Services
 - Select 6 Federal Regional Directors to begin development of federal based regional services
- Assessment Services
 - Build a permanent capability to produce climate assessments at national and regional scales
 - National, Regional and sector assessments
 - Regional modeling and downscaling
 - Technical support unit

Near-Term Enhancements

- Sector focused Services
 - Coasts
 - Coastal inundation hazards decision support
 - Drought
 - Develop regional early warning systems for Colorado River Basin, California and Southeast US.
 - Continue installation of soil moisture sensors around US

Near-Term Enhancements

- Information Services
 - Prototype Climate Services Portal
 - Develop Climate Model Data Portal for centralized archive and access to selected seasonal to century model based data sets, including re-analyses
- Data Services
 - Develop Climate Data Records to transform raw satellite data into unified and coherent long-term environmental observations and products critical to climate modelers and decision makers